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WORLD NITROGEN FERTILIZER SITUATION

Supply -

Until 1970-71, new production capacity for manufacture of nitrogen (N) fertilizers was built in anticipation of demand. Up to that time, most of the new capacity has been created in the developed exporting countries (Japan, U.S.A., West Germany, etc.). However, in the past two years, no significant additions to existing capacity were made in these countries, although some new capacity was built in developing countries.

The current oil crisis has serious implications for the nitrogen fertilizer industry. In the immediate future, there are likely to be serious limitations on the availability of raw materials (such as natural gas, naphtha and fuel oil) and power in the manufacture of nitrogen fertilizers. Already, Japan (which has been the largest exporter of N in recent years) has reduced/curtailed the export of nitrogen fertilizers. The other major exporters of nitrogen (U.S.A., Netherlands, Canada, Belgium, West Germany, Italy, Norway, etc.) are in similar straits. Data on nitrogen fertilizers production, consumption, and foreign trade by major countries for 1970-71 are presented in table 1. The inventories of nitrogen fertilizers in both the U.S.A. and Canada were at exceptionally low levels at the end of 1973. So, the availability of nitrogen fertilizers for import by developing countries would be drastically reduced (by as much as 50% or even more). Production of nitrogen fertilizers in developing countries may also suffer seriously due to the dislocations brought about by the oil crisis.

In the longer-run, it would affect the flow of new investment into the N fertilizer industry. Then too, it would affect the choice of feedstocks, production technology, size, and location of the new plants.

The increase in the price of crude oil and its products would add significantly to the cost of manufacture of nitrogen fertilizers. In the short-run, the limiting factor may be the availability of inputs, while in the longer-run, the cost factor would play a significant role. Some illustrative data on the share of feedstock costs in selling prices of N fertilizers are presented in Table 2.

TABLE 1

NITROGEN FERTILIZER:

PRODUCTION, CONSUMPTION, AND FOREIGN TRADE BY LEADING COUNTRIES, 1970-71

(in thousand metric tons of nutrient)

Country	PRODUCTION		CONSUMPTION		IMPORTS	
	Quantity	Rank	Quantity	Rank	Quantity	Rank
1. U.S.A.	9,291	1	7,189	1	842	2
2. U.S.S.R.	5,423	2	4,605	2	-	-
3. Japan	2,105	3	866	7	-	-
4. W. Germany	1,505	4	1,131	6	132	-
5. France	1,351	5	1,453	5	208	6
6. China	1,200*	6	2,987*	3	1,707*	1
7. Poland	1,030	7	823	8	-	-
8. Italy	956	8	595	10	84	-
9. Netherlands	930	9	405	-	14	-
10. India	846	10	1,487	4	491	3
11. U.K.	748	-	800	9	131	-
12. Belgium	486	-	167*	-	81	-
13. Canada	705	-	287	-	16	-
14. Norway	370	-	78	-	3	-
15. Romania	647	-	367	-	1	-
16. Brazil	20	-	276	-	255	4
17. Denmark	74	-	289	-	237	5
18. E. Germany	378	-	511	-	160	7
19. Cuba	4	-	159	-	154	8
20. Turkey	82*	-	243*	-	152*	9
21. Indonesia	45*	-	183*	-	138*	10
World Total	32,640		31,605		6,410	

* Unofficial estimate

Source: U.S. Department of Agriculture, A.S.C.S., The Fertilizer Supply. 1972-73, p.20

TABLE 1 (continued)

NITROGEN FERTILIZER:

PRODUCTION, CONSUMPTION, AND FOREIGN TRADE BY LEADING COUNTRIES, 1970-71

(in thousand metric tons of nutirent)

COUNTRY	EXPORTS		NET TRADE			
	Quantity	Rank	EXPORTS Quantity	EXPORTS Rank	IMPORTS Quantity	IMPORTS Rank
1. U.S.A.	977	2	155	10		
2. U.S.S.R.	215	8	215	8		
3. Japan	1,411	1	1,411	1		
4. W. Germany	483	4	351	5		
5. France	192	9	-		16	10
6. China	-	-	-		1,707	1
7. Poland	187	-	-		187	5
8. Italy	423	7	339	6		
9. Netherlands	595	3	581	2		
10. India	-	-	-		491	2
11. U.K.	39	-	-		92	
12. Belgium	442	5	361	4		
13. Canada	434*	6	418	3		
14. Norway	301	8	298	7		
15. Romania	187*	10	186	9		
16. Brazil	-	-			255	3
17. Denmark	-	-			237	4
18. E. Germany	2	-			158	6
19. Cuba	-	-			154	7
20. Turkey	-	-			152	8
21. Indonesia	-	-			138	9
World Total	6,515					

* Unofficial estimate

Source: U.S. Department of Agriculture, A.S.C.S., The Fertilizer Supply, 1972-73, p.20

TABLE 2

SHARE OF FEEDSTOCK COSTS IN SELLING PRICES OF NITROGEN FERTILIZERS

Location	Size of Ammonia Plant (t.p.d.)	Feedstock	Ratio of Feedstock cost to price of	
			Ammonia	Urea
1. U.S.A. Gulf Coast	1,000	Natural Gas	20%	9%
2. Western Europe	1,000	Naphtha and Fuel Oil	30%	17%
3. Persian Gulf Coast	1,000	Natural Gas	5%	
4. Developing Countries	600	Naptha and Fuel Oil	35%	20%

Note: Ratios derived from hypothetical cost data. The ratios are on the conservative side.

Thus, a doubling of the price of natural gas in the U.S. would increase the selling price of ammonia by 20 per cent, and that of urea by 9 per cent. A tripling of the price of crude oil in Western Europe would increase the selling price of ammonia by 60 per cent and that of urea by about 1/3. In the developing countries, a tripling of the price of crude petroleum would increase the selling prices of ammonia and urea by 70 and 40 per cent respectively.

Demand -

The demand for nitrogen fertilizers has been increasing secularly. The recent crisis in the world food situation has given further fillip to the growth in demand for N fertilizers. Thus, this year, the demand for nitrogen fertilizers in North America is expected to increase by 0.8 to 0.9 million tons of nutrient (mainly due to the record high prices for grain). Similar increases in demand can be expected in other grain producing regions of the world.

Prices -

Prices of nitrogen fertilizers have declined in the late sixties. They reached the trough in 1970-71. Thus, the price per ton of ammonia (declared value for export) has increased from $36.75 in 1970-71 to $68.50 in March 1973. During the same period, the price (declared value for export) of urea has increased from $53.00 to $75.40 per ton. These prices have doubled since March 1973.

Thus the oil crisis has serious impact, in the near-term on the availability, and in the longer-term on the price of nitrogen fertilizers.

Data on the relative importance of petroleum and fertilizesr in total imports of selected developing countries for the year 1970 are presented in table 3. The share of petroleum in total imports ranges between 1.5 and 11.8 per cent. The share of fertilizers in total imports ranges between 0.2 and 5.2 per cent in these countries. These shares provide clues as to the probable impact (in the short-run) of an increase in the price of oil on the import bill of these countries.

Data on production and consumption of nitrogen fertilizers in selected developing countries are presented in table 4. A significant proportion of domestic consumption of N in these countries is derived from imports. Any reduction in availability of N for import by the developing countries would seriously affect the grain production in these countries. Some illustrative figures on the probable losses in grain production due to a reduction in nitrogen fertilizer availability in India and Pakistan are presented in tables 5 and 6 respectively.

TABLE 3

RELATIVE IMPORTANCE OF PETROLEUM AND FERTILIZERS IMPORTS IN TOTAL IMPORTS OF SELECTED COUNTRIES - 1970

(million U.S. dollars)

Country	Exports (f.o.b.)	Merchandise Imports (c.i.f)			
		Total	Petroleum and Products	Manufactured Fertilizers	
				Total	N
1. Mexico	1,402	2,460.7	36.2 (1.5)	5.8 (0.2)	1.5 (26%)
2. Kenya #	191	327.1	35.8 (10.9)	6.4 (2.0)	1.5 (23%)
3. India	2,026	2,093.7	161.2 (7.7)	63.6 (3.0)	47.0 (74%)
4. Pakistan	723	1,170.9	67.6 (5.8)	60.4 (5.2)	51.3 (85%)
5. Philippines	1,119	1,210.4	143.4 (11.8)	10.4 (0.8)	8.2 (79%)

Note: Figures in parentheses are percentages.
Data refer to 1969.

Source: U.N. Trade by Commodities, 1970 and 1969.

Table 4

PRODUCTION AND CONSUMPTION OF NITROGEN FERTILIZERS IN SELECTED COUNTRIES

(thousand metric tons)

Year	Mexico		Kenya	India		Pakistan		Philippines	
	P	C	C	P	C	P	C	P	C
1948-49 1952-53	10.8 *	9.9	0.4#	23.6	63.1	n.a.	5.0	n.a.	18.1
1961-62 1965-66	117.1 *	199.3	10.2 #	207.1	429.3	74.0	95.0	8.5	49.3
1966-67	104.5	277.8	11.8	309.0	830.2	93.1	170.0	21.0	66.0
1967-68	173.0	298.0	13.0	402.3	799.5	107.2	253.0	43.6	64.3
1968-69	257.7	378.0	10.8	563.0	1,131.3	116.0	260.0	45.6	63.4
1969-70	362.3	392.2	16.0	729.6	1,360.3	173.6	357.0	53.5	101.4
1970-71	330.3	438.1	22.0	846.1	1,487.1	177.0	352.2	47.7	119.2
1971-72	327.4	519.1	20.0	978.0	1,756.0	170.0 25.0 B	226.0 42.0 B	54.3	122.0

P - Production ; C - Consumption ; B - Bangladesh ; * Average of four years; # Average of 3 yea

Sources: F.A.O., Production Year Book, 1971, and Monthly Bulletin of Agricultural Economics and Statistics, February 1973.

Thus, from table 5, we can see that a 50% reduction in N fertilizer available for use in India would result in a production loss of about 15 million tons of grain, assuming that all the reduction in N is borne by grain crops and the response ratio is 15 tons of grain per ton of N fertilizer.

TABLE 5

INDIA - IMPACT OF REDUCTION IN NITROGEN FERTILIZER AVAILABILITY ON GRAIN PRODUCTION

Basis: current consumption of 2 million metric tons of N

	Reduction in Availability of N (%)	Percentage of Reduction in N Attributable to Grain	Loss in Grain Production (million metric tons) A	B	C
I	75	100	11.2	15.0	22.5
		75	8.4	11.2	16.9
		50	5.6	7.5	11.2
II	60	100	9.0	12.0	18.0
		75	6.8	9.0	13.5
		50	4.5	6.0	9.0
III	50	100	7.5	10.0	15.0
		75	5.6	7.5	11.2
		50	3.8	5.0	7.5
IV	30	100	4.5	6.0	9.0
		75	3.4	4.5	6.8
		50	2.2	3.0	4.5
V	25	100	3.8	5.0	7.5
		75	2.8	3.8	5.6
		50	1.9	2.5	3.8

A - Response of grain to nitrogen fertilizer of 7.5:1
B - Response of grain to nitrogen fertilizer of 10:1
C - Response of grain to nitrogen fertilizer of 15:1

TABLE 6

PAKISTAN - IMPACT OF REDUCTION IN NITROGEN FERTILIZER AVAILABILITY ON GRAIN PRODUCTION

Basis: Current Consumption of 0.25 million metric tons of N

	Reduction in Availability of N (%)	Percentage of Reduction in N Attributable to Grain	Loss in Grain Production		
			A	B	C
			(million metric tons)		
I.	75	100	1.4	1.9	2.8
		75	1.0	1.4	2.1
		50	0.7	0.9	1.4
II.	60	100	1.1	1.5	2.2
		75	0.8	1.1	1.7
		50	0.6	0.8	1.1
III.	50	100	0.9	1.2	1.9
		75	0.7	0.9	1.4
		50	0.5	0.6	0.9

A. Response of grain to nitrogen fertilizer of 7.5:1

B. Response of grain to nitrogen fertilizer of 10:1

C. Response of grain to nitrogen fertilizer of 15:1